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ABSTRACT

This paper explains how the St. Cloud State University (Minnesota) College of Education is addressing the need for its graduates to be information technology-prepared in order to meet the demands and expectations of today's classroom. Following a summary of research that indicates the need for improved instruction about effective use of technology in education, an overview is provided of a course on media, materials, and methods of instruction. Topics addressed include: (1) prerequisite competencies, including operating system and application skills; (2) course content, including the World Wide Web, bibliographic instruction, trends in educational/instructional technology, communications tools, media and instruction, systematic planning for media use, visual principles and design, nonprojected visuals, projected visuals, audio media, motion media, computers in education, multimedia systems, computer networks, distance education, process technologies, equipment and setups, and copyright; (3) required assignments; (4) other activities; and (5) experimenting with offering the course as part of the elementary education block. (MES)

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TECHNOLOGY FOR PRE-SERVICE TEACHERS.

ED 436 127

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Abstract

Today's education major, early childhood, K-12, or special education, needs to be comfortable with technology in the classroom. What do preservice teachers need to know about technology? LOTS! Explore the COE media and materials course, newly revised to reflect content that teachers need to know BEFORE stepping into a classroom.

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Technology for Preservice Teachers

Today's classroom is very different from one10-15 years ago. Technology not only makes classroom instruction easier, it can also make it more difficult. This presentation will explore the course content of a media and materials course which is required of education majors, regardless of their discipline and grade range. Teachers in Minnesota are experiencing the Profiles of Learning and new Graduation Standards; technology is at the heart and soul, and preservice teachers must be able to help their students meet these goals and standards. Inquiry and technology are at the foundation. Explore the range of technology (and non-technology) course content.

A recent U. S. Department of Education study reported that relatively few teachers (20%) felt well prepared to integrate educational technology into classroom instruction (1999). The Milken Exchange on Education Technology commissioned the International Society for Technology in Education (ISTE) to survey teacher-preparation institutions. The 416 respondents, representing approximately 90,000 graduates per year, reported on the extent to which future teachers were being exposed to technology in their classes, field experience and curriculum materials. The report finds that teacher-training programs, in general, do not provide future teachers with the kinds of experiences necessary to prepare them to use technology effectively in their classrooms. The federal government has projected a need for 2.2 million new teachers over the next decade. These teachers must meet the challenge head on! This report is one which every College of Education dean must read and every College of Education faculty member must acknowledge. Truly the time to examine each of our teacher-preparation programs is now to insure our students graduate

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from our programs being able to practice their skills and incorporate the best technology available.

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Milken/ISTE Study

An analysis of survey data indicated:

- About a third of the respondents felt their programs are limited by deficiencies in their IT (instructional technology) facilities;

- Faculty IT skills tend to be comparable to the IT skills of students they teach;
- Distance education and computer-assisted instruction currently affect only a small proportion of students in teacher training institutions;
- Most teacher-preparation programs do not have a written, funded, regularly-updated technology plan;
- Most institutions report that IT is available in the K-12 classrooms where student teachers get their field experience; most student teachers, however, do not use technology during field experience and do not work with master teachers and supervisors who can advise them on IT use.

Additional findings of the study indicated:

- Formal stand-alone IT coursework does not correlate well with technology skills and the ability to integrate IT into teaching;

- To increase the technology proficiency of new teachers in K-12 classrooms, training institutions should increase the level of technology integration in their own academic programs.
- Where and how education students acquire their basic technology skills.

Studies have been conducted and reports have been written which indicate that information technology is at the foundation of education, addressing effective educational uses of IT for PreK-12 (Sandholtz et al., 1997; Wenglinsky, 1998). Teachers report a need for more time and training in both technology skills and technology-based pedagogy (Office of Technology Assessment, 1995), which indicates they lack confidence in their IT skills. It would be a logical conclusion, therefore, that instructional technology would be a hearty component of preservice teacher programs. During the past 15 years, the amount of IT in PreK-12 education has grown rapidly. For example, one estimate indicates Internet access is in about 85 percent of schools and 44 percent of classrooms (Jerald, 1998). Willis and Mehlinger (1996) summarized the situation in just a few sentences:

- "Most preservice teachers know very little about effective use of technology in education and leaders believe there is a pressing need to increase substantially the amount and quality of instruction teachers receive about technology. . . . The conclusion is that teacher education . . . is not preparing educators to work in a technology-enriched classroom"(p. 978).

This presentation/paper is not designed to summarize the Milken/ISTE Report, but rather to show how St. Cloud State University's College of Education is addressing the need for its graduates to be IT-prepared to meet the demands and expectations of today's classroom.

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St. Cloud State University Model

All College of Education majors must complete the media/materials course, a stand-alone IT course (IM 421: Media, Materials, and Methods of Instruction), where students are taught more than just computer-literacy skills. They are taught how to incorporate technology in the classroom by seeing their instructors talk it and walk it by including IT in their classrooms. These faculty members serve as role models for the preservice teachers.

Currently the IM 421 course is under revision. When the institution converted from a quarter to semester system Fall 1998, the 4-credit course was initially planned to be a straight conversion to a 3-credit course. As with many program changes, there were negotiations which were necessary and modifications necessary to accommodate the needs of departments as well as maintain a 120-credit (semester) minimum for graduation.

"In the good old days" students would take the PPST and enroll in the media/materials course. As recently as 1993 students approximately 50% of the students in the class had little or no competency with computers and a number of those students had no desire to learn about them! As the years have progressed, more students have a working knowledge of computers (e-mail, WWW and limited word processing). Computer literacy and information literacy are usually not well-honed skills brought into this course, although there will always be the 5-10% who are extremely knowledgeable of computers. Even when they are "computer literate" many lack an understanding of how to incorporate technology into the classroom and do it effectively throughout the course. Currently, most students enter the course with their own e-mail account, limited to extensive skills using the WWW for basic searches, and basic word processing skills).

In this 3-credit course instructors were expected to not only teach the technology but also incorporate it into classroom applications. Because of those negotiations referred to previously, the course was reduced to 2 credits, with a transitional required co-requisite of a 1-credit applications course (the total being 3 credits). This 2/1 combination will be soon replaced with the original 2-credit media/materials course, with the course content to remain approximately the same. One solution for this dilemma has been to have a pre-requisite computer literacy/applications proficiency requirement, which can be demonstrated by enrolling in certain lower-division courses or being able to pass a competency exam. By requiring the computer proficiency as a prerequisite, classroom time is not taken teaching computer and other instructional technology basics, but rather having students do the applications associated with their individual disciplines/grade ranges.

Competencies as a prerequisite. First, it is important to understand the competencies which students are expected to have prior to enrolling in this required media/materials course. The competencies include:

- OS skills: start-up/shutdowns/restarts; desktops (icons, menus, windows management); file handling; disk/volume issues; documents and applications; networking operations.
- Application skills/productivity: general applications (save, file types, editing setting/changing margins; printers/printing options; integration of applications) and within applications (word processing, graphical software, internet, and database and spreadsheet software).

One specific course (IM 260: Information Technologies) has been modified to give students the "proficiency" they need to walk into the media/materials course prepared to create materials to be used with instructional technology as well as use the technology. Students spend time with different aspects of distance education, including designing Web pages and searching the Internet for resources. This course is a general education course, not directed toward education but rather general applications. They learn the basics, but the classroom adaptation is left to the faculty in the media/materials course. Another course within the College of Education (IM 245: Microcomputers in Classrooms and Media Centers) provides most of these same proficiencies but is designed for COE majors, and it is a survey of available hardware,

software, and related instructional materials for use by classroom teachers.

IM 421: Media, Materials, and Methods of Instruction. This course addresses the theory and techniques of selection, evaluation, and use of print and non-print materials, such as library materials, display materials, slides, motion pictures, videotapes, sound recordings, microcomputer programs, the internet, and telecommunications (including interactive television). This media/materials course includes a wide variety of requirements as well as a number of options and alternatives for students, based on their preferences as well as discipline and grade differences.

The course content for IM 421: Media, Materials, and Methods of Instruction include the following:

- World Wide Web - researching educational materials on the WWW and Internet;
- Bibliographic instruction - learning to find resource materials located both in-house within the SCSU library and through other sources (ILL, electronic full-text documents, etc.)
- Trends in educational/instructional technology, based on Donald Ely's book.
- Communications tools -writing letters and memos (as applicable), interviewing to obtain information, incorporating critical questioning in the classroom, creating and giving effective presentations, writing instructions/directions, and designing a survey/questionnaire instrument;
- Media and instruction - understanding the role(s) of media in education and being aware of the domains of learning, and designing media and materials to support these domains;
- Systematic planning for media use - writing behavioral objectives, establishing the behavioral objective as a guide in selection media and materials, and designing and developing learning activities which follow the ASSURE Model.
- Visual principles and design - defining visual literacy, applying principles and elements of design to visual materials, and preparing visuals according font and size guidelines;
- Nonprojected visuals - discussing the types of nonprojected visuals which may be used in the classroom, determining the most appropriate non-projected visuals to be used based on needs and objectives, displaying visuals appropriately, creating bulletin boards, and planning and making arrangements for a fieldtrip;
- Projected visuals - comparing the advantages/disadvantages of types of projected visuals and preparing projected visuals (transparencies, slides);
- Audio media - differentiating between audio formats used in education and determining when audio media can be used to enhance classroom activities;
- Motion media - identifying types and formats of motion media, preparing instructional media/materials that include motion, and understanding the special attributes of motion media;
- Computers in education - identifying the roles of computers in education, demonstrating proficiency in using computers in the educational setting, understanding the role(s) of computers in education, selecting computer software and hardware based on availability and needs, evaluating computer software and hardware, and gaining hands-on experience with CD-ROMs, interactive programs, etc.;

- Multimedia systems - comparing multimedia systems to determine the most appropriate to meet objectives, identifying equipment necessary to use the multimedia systems, and discussing the advantages/disadvantages of each type of multimedia system;

- Computer networks - understanding the characteristics of computer networks (LAN, WAN, Internet, intranet, WWW, etc.), searching the WWW and Internet for resources and information, knowing the basics of creating a Web site/page, and discussing access and supervision students should have for using the Internet;

- Distance education - discussing the educational and instructional uses of distance learning/telecommunications, identifying the formats for distance education (ITV, Internet, WWW, etc.), comparing and contrasting the role of the instruction in each telecommunications system, determining media and materials to be used for each format, and setting up an ergonomically sound distance education classroom;

- Process technologies, simulations, games, etc. - understanding how process technologies help demonstrate effective learning and discussing the similarities/differences between games and simulations;

- Looking ahead - understanding the trends in media and technology, knowing what the "school of the future" will very like look like, using hardware and software which has been designed for the next century, and discussing some professional organizations in educational technology;

- Looking back - identifying earlier media/material formats, using the "older" formats when appropriate, and selecting appropriate mediums to be used in the classroom;

- Equipment and setups - practicing safety when working with different types of media, moving equipment safely, and identifying unsafe working conditions involving media and equipment;

- Copyright guidelines - applying copyright laws and guidelines when creating media and materials, incorporating use of media/materials in the classroom according to copyright guidelines, understanding the implications of the Fair Use Doctrine, knowing the fines and penalties associated with copyright infringement, and explaining to students the purpose and need for copyright laws and guidelines.

Required assignments for this course include the following:

- E-mail account - students must have an active e-mail account. Today, most students have either an SCSU account or one through an Internet provider. Purpose: students must be able to contact me (and visa versa) and it will be a means for submitting one of their assignments;
- Memo - following memo format, students are to indicate to me what their major project will be. Purposes of assignment: have students write a memo using the appropriate format, determine the topic of their course-long project, and identify the culminating project (selected from a number of options, print or nonprint);
- E-mail assignment - e-mail message summarizing WWW search of educational materials. Purposes of assignment: get the students using e-mail (it's still new to some of them), have them search out educational materials (lesson plans, organizations, papers, etc.) found on the WWW, and summarize the contents of the Web search;
- Letter - following the letter format, students are to draft a letter to a publisher requesting permission to duplicate and distribute a copy of a journal article to each of the students in their class. Purposes of the assignment: have students write a letter following appropriate format style, identify a journal

article which might be distributed to students, and emphasize the importance of securing permission from a publisher to duplicate and distribute this material (according to copyright guidelines);

- Paper/project outline - following the ASSURE Model, students will create an outline identifying media, materials, and methods of instruction they will use during a lesson or unit of instruction. Purposes of assignment: encourage (force) them to think about the media/materials they will use and how they help students meet the objectives of the unit as well as encourage effective design and planning of a unit;
- Mediagraphy - using the SCSU library and its outreach capabilities, students will create a mediagraphy (also known as a mediography or bibliography) of resource materials which they might use during this course-long project on which they are working. Purposes: have students learn and use the various search strategies for finding information pertinent to their topic and give students an opportunity to structure their findings in a final format -a mediagraphy which could be used to support academic writing;
- Videotape - in a group of 3-6, students will design, create, and videotape an educational learning activity. They select the topic, the student population, and the place the videotaping will take place. Purposes of assignment: teach students how to plan a videotape (storyboarding), encourage them to experiment with a new educational/instructional medium, and create a finished product that might be used in one of their classrooms;
- Handout - following visual literacy and instructional design guidelines, students will create a handout relevant to their culminating project. Purposes of assignment: get students thinking in terms of computer-generated materials, allow students to create well-planned and high quality materials;
- Transparency - following visual literacy and instructional design guidelines, students will create a multi-color transparency with one graphic, multiple colors of text, and multi font sizes. Purposes of assignment: have students apply appropriate guidelines for creating a transparency, show students there is much more in the way of transparencies that those created with a photocopier or thermofax machine, and encourage creativity in the use of graphics;

- Major project - following visual literacy and instructional design guidelines appropriate to their project, students will create a project (mobile, game, computer-delivered presentation, videotape, audiotape, bulletin board, etc.), write a grammatically correct "blue print" following the ASSURE outline which they created for a prior assignment, and give an oral presentation to the class on the process/procedures they followed in the creation of this project. Purposes of assignment: get students to think of media/material options which they have, encourage student creativity in designing media/materials, reinforce the "writing across the curriculum" concept of well-prepared written materials, document their use of a media/material which they created, and support the need for oral communication skills in the classroom;

- In addition to the above assignments, other activities include, but are not limited to, the following:

- practicing with the ITV (interactive television system);
- designing a Web page;
- previewing and evaluating several CD-ROM or interactive computer disks;
- setting up and using "older" equipment such as filmstrips, film projectors, slide projectors, etc.

The above four options are largely elective based on the individual instructor's preference, strengths, and time commitment.

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Latest Experiment

Recently this College of Education Teacher Development department asked whether the Information Media department would consider offering the media/materials course as part of the elementary education block. Prior to this time, students enrolled in the media/materials course which was most convenient for them. This meant that early childhood, elementary, secondary, special education, music, and physical education majors were all together in a course. It was decided to "block" some sections of this course with elementary education courses. The intent was to have the media/materials course and one of the blocked courses paired so that there was integration of technology in the other course. In order for this concept to work, the need was there for the instructors of both classes to coordinate some of their activities and content. Fall 1998 was the first time this paired concept was used, and (as with many ideas in education) there were some "bugs" and glitches that have yet to be worked out. If this is to continue, there will be continued need for a cooperative work arrangement between the two instructors of the courses so that integration and continuity can and will take place. There were the other normal problems associated with initiating a new concept, but those will be worked out with both time and modification to the courses involved.

Conclusion

This is definitely the time to evaluate and make changes to our preservice teacher education curriculum in order to equip our graduates with the skills they need for today's classroom. As more schools become connected with the Internet and have WWW access, there is greater potential for student researcher. Technology is now advanced so that media centers and classrooms are equipped with more than an overhead projector and a filmstrip projector. Whether we are referring to CD-ROMs, videodisk players, or computers, we are looking to a classroom which is vastly different than the ones 10-15 years ago. Will new teachers be prepared to teach in a digital age- they certainly should be able to if Colleges of Education make the commitment to insure a curriculum which is rich in technology introductions, technology applications, and technology integrations.

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